GEOLOGICAL AND NATURAL HISTORY SURVEY OF CANADA.
ALFRED R. C. SELWYN, C.M.G., LL.D., F.R.S., DIRECTOR.

CHEMICAL CONTRIBUTIONS

TO THE

GEOLOGY OF CANADA,

FROM THE

LABORATORY OF THE SURVEY,

BY

G. CHRISTIAN HOFFMANN, F. Inst. Chem., F.R.S.C.,
Chemist and Mineralogist to the Survey.

ASSISTANTS:

F. D. ADAMS, M.Ap.Sc.
E. B. KENRICK, B.A.

PUBLISHED BY AUTHORITY OF PARLIAMENT.

MONTREAL:
DAWSON BROTHERS.
1888.

To Alfred R. C. Selwyn, C.M.G., LL.D., F.R.S.,
Director of the Geological and Natural History Survey of Canada.

Sir,—I beg to submit, herewith, my report upon the work carried out in the Laboratory of this Survey during the past year. As will be seen, this was purely of a practical character, it having been confined exclusively to the examination of such minerals, etc., etc., as promised to prove of economic importance. During the period in question, some six hundred and ninety-eight mineral specimens were received, either for identification, for information in regard to their economic value, or for analysis or assay. The results obtained were in a large number of instances of no great interest, save to those immediately concerned, and have, therefore, not been incorporated in the present report, which embraces only such examinations, analyses, or assays, as were considered likely to prove of general interest.

Mr. F. D. Adams has—with the exception of about three and a-half months during the summer, when he was engaged in field-work—in the capacity of Assistant Chemist, rendered good service, and Mr. E.B. Kenrick worked faithfully and diligently as Junior Assistant Chemist, up to the end of August, when he left to accept an appointment at St. John's College, Winnipeg. His successor, Mr. R. A. A. Johnston, has also assisted in some of the work herein recorded.

Such examinations or analyses as were carried out by these gentlemen have, in all instances, been duly credited to them: those not otherwise designated, having been made by myself.

I have the honor to be,

Sir,

Your obedient servant,

G. CHRISTIAN HOFFMANN.

Ottawa, December 31, 1887.

Digitized by the Internet Archive
in 2018 with funding from
This project is made possible by a grant from the Institute of Museum and Library Services as administered by the Pennsylvania Department of Education through the Office of Commonwealth Libraries

https://archive.org/details/chemicalcontribu00hoff

CHEMICAL CONTRIBUTIONS

TO THE

GEOLOGY OF CANADA,

FROM THE

LABORATORY OF THE SURVEY.

COALS AND LIGNITES.

[In continuation of previous reports on this subject, Report of Progress, 1882-83-84,—Report M, and Annual Report, 1885, Report M.]

Lignite from Egg Creek, North Saskatchewan.

52.—LIGNITE.—From seam near mouth of Egg Creek, North Saskatchewan River, opposite Victoria, township 58, range 17, west of the fourth initial meridian, District of Alberta, N. W. T. Seam thirteen inches thick. Geological position—Cretaceous, Pierre. Collected by Mr. J. B. Tyrrell, and referred to by him in Annual Report for 1886, p. 117 E.

Structure, somewhat fine lamellar, tolerably compact; it contains numerous interposed patches of mineral charcoal; in parts coated with a film of ferric hydrate; color greyish-black to almost black; lustre along the surfaces of bedding dull, that of the cross-fracture sub-resinous to resinous; fracture uneven; apart from the patches of mineral charcoal, does not soil the fingers; powder dark-brown, inclining to blackish-brown; it communicates a deep brownish-red color to a boiling solution of caustic potash; by exposure to the air, splits in the direction of the bedding and falls to pieces.

Analysis by fast coking gave: Analysis of.

Hygroscopic water	11·91
Volatile combustible matter	36·39
Fixed carbon	45·04
Ash	6·66
	100·00
Coke, per cent	51·70
Ratio of volatile combustible matter to fixed carbon	1 : 1·24

It yields a non-coherent coke; the gases evolved during coking burnt with a yellowish, feebly luminous, smokeless flame. The ash has a light brownish-yellow color,—exposed to a bright red heat it becomes slightly agglutinated, at a most intense red heat it forms a slaggy mass.

Lignite from Big Island seam, North Saskatchewan.

53.—Lignite.—From the Big Island seam, North Saskatchewan River, twelve miles above Edmonton, township 51, range 25, west of the fourth initial meridian, District of Alberta, N. W. T. Seam three feet eight inches thick. Geological position—Lower Laramie, Edmonton series. Collected by Mr. J. B. Tyrrell, and referred to by him in Annual Report for 1886, p. 112 E.

Structure, coarse lamellar—made up of layers of a greyish-black, dull, and dense, bright black coal, with numerous interposed patches of mineral charcoal; it was in parts stained with ferric hydrate; fracture uneven; apart from the patches of mineral charcoal, does not soil the fingers; powder brownish-black; it communicates a dark brownish-red color to a boiling solution of caustic potash; by exposure to the air becomes fissured, and as a result falls to pieces.

Analysis of.

Analysis by fast coking gave:

Hygroscopic water	8·92
Volatile combustible matter	28·70
Fixed carbon	37·44
Ash	24·94
	100·00
Coke, per cent	62·38
Ratio of volatile combustible matter to fixed carbon	1 : 1·30

It yields a non-coherent coke; the gases evolved during coking burnt with a yellowish, slightly luminous, smokeless flame. The ash has a reddish-white color,—exposed to a bright red heat it becomes slightly fritted, at a most intense red heat it forms a slaggy mass.

Lignite from Ross' seam, North Saskatchewan.

54.—Lignite.—From Ross' seam, North Saskatchewan River, right bank, one and a-half mile below ferry at Edmonton, District of Alberta, N. W. T. Seam four feet thick. Geological position—Lower Laramie, Edmonton series. Collected by Mr. J. B. Tyrrell, and referred to by him in Annual Report for 1886, p. 113 E.

Structure, fine lamellar—compact; color black; lustre resinous; fracture uneven; does not soil the fingers; it was in parts coated with a slight deposit of ferric hydrate; powder dark-brown, incli-

ning to blackish-brown; it communicates a deep brownish-red color to a boling solution of caustic potash; by exposure to the air, splits along the line of bedding and falls to pieces.
Analysis by fast coking gave:

Analysis of.

Hygroscopic water	11·47
Volatile combustible matter	36·12
Fixed carbon	48·57
Ash	3·84
	100·00
Coke, per cent	52·41
Ratio of volatile combustible matter to fixed carbon	1 : 1·34

It yields a non-coherent coke; the gases evolved during coking burnt with a yellowish, somewhat luminous, slightly smoky flame. The ash has a dull yellow color,—exposed to a bright red heat it becomes slightly fritted, at a most intense red heat it readily fuses to a vitrified mass.

55.—Lignite.—From the Red Deer River, twelve miles above Tail Creek, township 38, range 24, west of the fourth initial meridian, District of Alberta, N. W. T. Seam ten feet, with three feet of interbedded sandstone and shale. Geological position—Lower Laramie, Edmonton series. Collected by Mr. J. B. Tyrrell, and referred to by him in Annual Report for 1886, p. 60 E.

Lignite from Red Deer River, above Tail Creek.

Structure, somewhat fine lamellar—made up of greyish-black, dull, and bright black layers, with an occasional intervening layer of mineral charcoal; fracture uneven, occasionally, in parts verging on the conchoidal; it was, here and there, coated with a slight deposit of ferric hydrate; powder greyish-brownish-black; it communicates a deep brownish-red color to a boiling solution of caustic potash; by exposure to the air falls to pieces.
Analysis by fast coking gave:

Analysis of.

Hygroscopic water	7·66
Volatile combustible matter	25·90
Fixed carbon	34·53
Ash	31·91
	100·00
Coke, per cent	66·44
Ratio of volatile combustible matter to fixed carbon	1 : 1.33

It yields a non-coherent coke; the gases evolved during coking burnt with a yellowish, slightly luminous, smokeless flame. The

ash has a greyish-brown color—exposed to a bright red heat it becomes slightly agglutinated, at a most intense red heat it becomes fritted.

Lignite from Red Deer River, below Tail Creek.

56.—Lignite.—From the Red Deer River, four miles below Tail Creek, township 37, range 22, west of the fourth initial meridian, District of Alberta, N. W. T. Ten and a-half feet coal in an eighteen feet section, thickest seam three feet. Geological position—Lower Laramie, Edmonton series. Collected by Mr. J. B. Tyrrell, and referred to by him in Annual Report for 1886, p. 61 E.

Structure, compact; color black; lustre resinous; fracture more or less conchoidal; does not soil the fingers; powder brownish-black; it communicates a deep brownish-red coloration to a boiling solution of caustic potash; by exposure to the air falls to pieces.

Analysis of.

Analysis by fast coking gave:

Hygroscopic water	10·02
Volatile combustible matter	32·11
Fixed carbon	45·19
Ash	12·68
	100·00
Coke, per cent	57·87
Ratio of volatile combustible matter to fixed carbon	1 : 1·41

It yields a non-coherent coke; the gases evolved during coking burnt with a yellowish, slightly luminous, smokeless flame. The ash has a light reddish-brown color,—exposed to a bright red heat it does not become agglutinated, at a most intense heat it forms a slaggy mass.

Lignite from Knee Hills Creek, Red Deer River.

57.—Lignite.—From seam on Knee Hills Creek (a tributary of the Red Deer River), township 29, range 23, west of the fourth initial meridian, District of Alberta, N. W. T. Seam four feet thick. Geological position—Lower Laramie, Edmonton series. Collected by Mr. J. B. Tyrrell, and referred to by him in Annual Report for 1886, p. 72 E.

Structure, somewhat coarse lamellar—made up of greyish-black, dull, and bright black layers; fracture uneven; it contains, here and there, a little brownish-yellow transparent resin; does not soil the fingers; powder brownish-black; it communicates a deep brownish-red color to a boiling solution of caustic potash; by exposure to the air becomes slightly fissured, still remaining, however, tolerably firm and hence, in this regard, is superior to the generality of lignites.

Analysis by fast coking gave: Analysis of.

Hygroscopic water	9·86
Volatile combustible matter	34·89
Fixed carbon	46·57
Ash	8·68
	100·00
Coke, per cent	55·25
Ratio of volatile combustible matter to fixed carbon	1 : 1·33

It yields a non-coherent coke; the gases evolved during coking burnt with a yellowish, somewhat luminous, smokeless flame. The ash has a yellowish-brown color,—exposed to a bright red heat it does not become agglutinated, at a most intense red heat it forms a slaggy mass.

58.—Lignite.—From a seam on Meeting Creek (a tributary of Battle River), township 45, range 17, west of the fourth initial meridian, District of Alberta, N. W. T. Seam four and a-half feet thick. Geological position—Lower Laramie, Edmonton series. Collected by Mr. J. B. Tyrrell, and referred to by him in Annual Report for 1886, p. 88 E. Lignite from Meeting Creek, Battle River.

Structure, fine lamellar—compact; color black; lustre resinous; fracture uneven; does not soil the fingers; powder brownish-black; it communicates a deep brownish-red color to a boiling solution of caustic potash; by exposure to the air splits in the direction of the bedding and falls to pieces.

Analysis by fast coking gave: Analysis of.

Hygroscopic water	11·68
Volatile combustible matter	35·82
Fixed carbon	49·88
Ash	2·62
	100 00
Coke, per cent	52·50
Ratio of volatile combustible matter to fixed carbon	1 : 1·39

It yields a non-coherent coke; the gases evolved during coking burnt with a yellowish, feebly luminous, smokeless flame. The ash has a reddish-brown color—exposed to a bright red heat it becomes agglutinated, at a most intense read heat it forms a slaggy mass.

59.—Lignitic Coal.—From Rocky Mountain House seam, one mile below the mouth of Clearwater River, on the North Saskatchewan

Lignitic coal from Rocky Mountain House seam, North Saskatchewan.

River, section 33, township 39, range 7, west of the fifth initial meridian, District of Alberta, N. W. T. Seam two feet or more. Geological position—Laramie. Collected by Mr. J. B. Tyrrell, and referred to by him in Annual Report for 1886, p. 102 E.

Structure, compact; it is intersected by numerous thin plates of gypsum and calcite, and contains, in parts, a few films of iron-pyrites; shows well-defined planes of cleat; color black; lustre resinous; does not soil the fingers; powder brownish-black; it communicates a brownish-red color to a boiling solution of caustic potash; by exposure to the air becomes fissured, and hence somewhat tender. Another specimen from the same seam had a somewhat coarse lamellar structure, made up of layers of a greyish-black, dull, and bright black coal; this also showed well-defined planes of cleat; it contained only a few plates of calcite, and after the same length of exposure to the air as the other specimen, still remained hard and firm.

Analysis of.

Analysis by fast coking gave:

Hygroscopic water	7·01
Volatile combustible matter	34·63
Fixed carbon	50·34
Ash	8·02
	100·00
Coke, per cent	58·36
Ratio of volatile combustible matter to fixed carbon	1:1·45

It yields a non coherent coke; the gases evolved during coking burnt with a yellowish, somewhat luminous, slightly smoky flame. The ash has a dark brownish-yellow color,—exposed to a bright red heat it becomes slightly fritted, at a most intense red heat it forms a slaggy mass.

Lignitic coal from Red Deer River, near outer edge of Foot Hills.

60.—Lignitic Coal.—From a seam on Red Deer River, near the outer edge of the Foot Hills, township 31, range 7, west of the fifth initial meridian, District of Alberta, N. W. T. Seam nine feet thick. Geological position—Laramie. Collected by Mr. J. B. Tyrrell, and referred to by him in Annual Report for 1886, p. 125 E.

Structure, very fine lamellar—compact; it contains interstratified, more or less disconnected, lenticular layers of jet black lustrous coal, and numerous patches of mineral charcoal; color greyish-black to black; lustre, apart from that of the layers above referred to, resinous; fracture uneven; powder dark-brown, inclining to blackish-brown; it communicates a brownish-red color to a boiling

solution of caustic potash; it, apparently, resists exposure to the air and is, on the whole, a firm coal.

Analysis by fast coking gave: Analysis of.

Hygroscopic water	4·97
Volatile combustible matter	36·87
Fixed carbon	54·05
Ash	4·11
	100·00
Coke, per cent	58·16
Ratio of volatile combustible matter to fixed carbon	1 : 1·46

It yields a non-coherent coke: the gases evolved during coking burnt with a yellow, luminous, smoky flame. The ash has a brownish-yellow color,—exposed to a bright red heat it does not become agglutinated, at a most intense red heat it readily fuses to a vitrified mass.

61.—Lignitic Coal—From Lewes River (a branch of the Yukon River), four and a-half miles above Rink Rapid, N.W.T. Seam about three feet, but in part shaly. Geological position—Laramie. Collected by Dr. G. M. Dawson. Lignitic coal from Lewes River.

Structure, fine lamellar—compact; color greyish-black; lustre resinous; hard and firm; fracture uneven; it is, here and there, intersected by a few films of calcite; does not soil the fingers; powder brownish-black; it communicates a dark, but not deep, brownish-red color to a boiling solution of caustic potash; resists exposure to the air.

Analysis by fast coking gave: Analysis of.

Hygroscopic water	6·03
Volatile combustible matter	36·92
Fixed carbon	49·03
Ash	8·02
	100·00
Coke, per cent	57·05
Ratio of volatile combustible matter to fixed carbon	1 : 1·33

It yields a non-coherent coke. Color of the ash, brown with a faint reddish tinge, the same when exposed to a bright red heat does not agglutinate, at a most intense red heat it readily fuses to a vitrified mass.

62.—Coal—From the Bow River Coal Mine, south side of Bow River, a quarter of a mile S. 25° E. from mouth of Coal Creek, section 13,

Coal from Bow River Mine, south side of Bow River.

township 26, range 5, and section 18, township 26, range 4, west of the fourth initial Meridian, District of Alberta, N.W.T. Seam said to be ten feet ten inches, with three partings, total thickness of coal seven feet seven inches. The part of the workings from which this sample was taken is some three hundred feet from the outcrop, and about two hundred feet below the level of the prairie. From lower part of seam. Geological position—Lower Laramie. Received from Mr. J. W. Vaughan. Referred to in Annual Report for 1886, p. 122 E.

[Specimen 28—Report of Progress 1882-83-84, p. 32 M.—is from a natural exposure of the same seam on the north side of the river.] Structure somewhat coarse lamellar, made up of alternating layers of a greyish-black, somewhat dull, and bright black coal; it contains a large amount of brownish-yellow resin diffused through its substance, as also an occasional film of calcite; the specimen examined was hard and firm; fracture, on the whole, irregular, that of the more lustrous layers, occasionally imperfectly conchoidal; does not soil the fingers; powder dark brown inclining to blackish-brown; it communicates a pale brownish-yellow color to a boiling solution of caustic potash; resists exposure to the air.

Analyses of.

Analyses by slow and fast coking gave:

	Slow coking.	Fast coking.
Hygroscopic water	4·41	4·41
Volatile combustible matter	33·89	40·32
Fixed carbon	54·70	48·27
Ash	7·00	7·00
	100·00	100·00
Coke, per cent	61·70	55·27
Ratio of volatile combustible matter to fixed carbon	1 : 1·61	1 : 1·20

It yields—by slow coking, a non-coherent coke—by fast coking, a firm compact coke, the coking being doubtless materially influenced by the presence of the resin; the gases evolved during coking burnt with a yellow, luminous, smoky flame. The ash has a brownish-red color,—exposed to a bright red heat it becomes slightly fritted, at a most intense red heat it forms a slaggy mass.

Coal from Peter seam, Marten Creek, Rocky Mountains.

63.—Coal—From the Peter seam, second crossing, Marten Creek, Crow Nest Pass, Rocky Mountains, British Columbia. Seam said to be fourteen feet thick. Geological position—Cretaceous, Kootanie series. Taken thirty feet in from outcrop. Locality

referred to by Dr. G. M. Dawson in Annual Report for 1885, p. 75 B.

This coal has a crumpled, foliated structure; shows slickensides color greyish-black to black; lustre resinous—that of the slickensided surfaces occasionally inclining to vitreous; firm; fracture irregular; slightly soils the fingers; does not contain any interlaminated calcite but occasionally, here and there, a delicate film of iron-pyrites; powder brownish-black; it communicates a faint brownish-yellow tinge to a boiling solution of caustic potash; resists exposure to the air,

Specific gravity 1·3052 (temp. 15·5°C.)—Weight of one solid cubic foot, calculated from the specific gravity, 81·57 pounds.

Analyses of.

Analyses by slow and fast coking gave:

	Slow coking.	Fast coking.
Hygroscopic water	1·79	1·79
Volatile combustible matter	25·45	33·04
Fixed carbon	69·14	61·55
Ash	3·62	3·62
	100·00	100·00
Coke, per cent	72·76	65·17
Ratio of volatile combustible matter to fixed carbon	1 : 2·72	1 : 1·86

An ultimate analysis gave:

		Exclusive of sulphur, ash, and hygroscopic water.
Carbon	80·51	85·57
Hydrogen	5·20	5·53
Oxygen and nitrogen	8·37	8·90
Sulphur	0·51	—
Ash	3·62	—
Hygroscopic water	1·79	—
	100·00	100·00

Calorific power of,—experimental.

Calorific power,* experimental, determined by Thompson's calorimeter

Indicated power of fuel in calories 8050
Indicated evaporative power ..... 14·99 pounds of water (at 100°C.) per pound of fuel.

deducting the units of heat necessary to vaporise the hygroscopic

* For data employed in calculating the calorific power, see Report of Progress, 1882-83-84, p. 4 M. under V[1]., and p. 43 M. et seq. under heading "Remarks on accompanying tables."

and combined water, and water of combustion of the fuel, we have an

Indicated power of fuel in calories 7790
Indicated evaporative power ..... 14·51 pounds of water (at 100°C.) per pound of fuel,

and these latter figures will express the greatest effect obtainable from this fuel, when used in generating steam.

Calorific power of,—theoretical

Calorific power, theoretical, calculated from its chemical composition.

Expressed in calories 7990
Pounds of water (at 100°C.) evaporated by 1 lb. of fuel 14.88

deducting from these figures the heat units required to vaporise the hygroscopic and combined water, and water of combustion of the fuel, we obtain the following values :

Expressed in Calorics 7730
Pounds of water (at 100° C,) evaporated by 1 lb. of fuel 14.39

which latter give the closest approximation to the available heat.

It yields—by slow coking, a non-coherent coke—by fast coking, a compact, firm, coherent coke, in concentric layers, in which the form of the particles of coal from which it has been derived is entirely obliterated ; the gases evolved during coking burnt with a yellow, luminous, smoky flame. Color of the ash white with a faint reddish tinge,—exposed to a bright red heat it does not become agglutinated, at a most intense red heat it becomes slightly fritted.

Coal from Jubilee seam, Marten Creek, Rocky Mountains.

64.—Coal—From the Jubilee seam, second crossing, Marten Creek, Crow Nest Pass, Rocky Mountains, British Columbia. Seam said to be thirty feet thick. Geological position—Cretaceous, Kootanie series. Taken fifty-five feet in from outcrop. Locality referred to by Dr. G. M. Dawson in Annual Report for 1885, p. 75 B.

The description given of the immediately preceding coal, viz., that from the Peter seam, applies also to this one, the only difference being that this coal did not contain any visible iron-pyrites, and communicated a very pale brownish-yellow, and hence a somewhat more decided, color to a boiling solution of caustic potash.

Specific gravity 1·3088 (temp. 15·5°C.)—Weight of one solid cubic foot, calculated from the specific gravity, 81·80 pounds.

Analyses by slow and fast coking gave: Analyses of.

	Slow coking.	Fast coking.
Hygroscopic water	1·89	1·89
Volatile combustible matter	24·88	30·41
Fixed carbon	68·86	63·33
Ash	4·37	4·37
	100·00	100·00
Coke, per cent	73·23	67·70
Ratio of volatile combustible matter to fixed carbon	1 : 2·77	1 : 2·08

An ultimate analysis gave:

		Exclusive of sulphur, ash, and hygroscopic water.
Carbon	80·04	85·82
Hydrogen	4·94	5·30
Oxygen and nitrogen	8·28	8·88
Sulphur	0·48	—
Ash	4·37	—
Hygroscopic water	1·89	—
	100·00	100·00

Calorific power, experimental, determined by Thompson's calorimeter: Calorific power of,—experimental.

Indicated power of fuel in calories 8026
Indicated evaporative power ..... 14·94 pounds of water (at 100° C.) per pound of fuel.

deducting the heat units required to vaporise the hygroscopic and combined water, and water of combustion of the fuel, we have an

Indicated power of fuel in calories 7778
Indicated evaporative power ..... 14·48 pounds of water (at 100° C.) per pound of fuel.

and these latter figures will express the greatest effect obtainable from this fuel, when used in generating steam.

Calorific power, theoretical, calculated from its chemical composition: Calorific power of,—theoretical

Expressed in calories 7866
Pounds of water (at 100° C.) evaporated by 1 lb. of fuel .. 14·64

deducting from these figures the heat units required to vaporise

the hygroscopic and combined water, and water of combustion of the fuel, we obtain the following values:

Expressed in calories	7618
Pounds of water (at 100° C.) evaporated by 1 lb. of fuel	14 18

which latter give the closest approximation to the available heat. It yields—by slow coking, a non-coherent coke—by fast coking, a compact, firm, coherent coke, in concentric layers, in which the form of the particles of coal from which it has been derived is entirely obliterated; the gases evolved during coking burnt with a yellow, luminous, smoky flame. Color of ash, white—exposed to a bright red heat it remains unaffected, at a most intense red heat it becomes fritted.

Coal from north of Coal Harbor, Vancouver Island.

65.—Coal—From shaft sunk on two to three feet seam north of Coal Harbor, Quatsino Sound, Vancouver Island, British Columbia. Geological position—Cretaceous. Collected by Dr. G. M. Dawson, and referred to by him in Annual Report for 1886, p. 93 B.

Structure, very fine lamellar; the lines of bedding, which are very numerous and close together, are almost obliterated—compact; it is here and there intersected by thin plates of calcite, as also by an occasional film of pyrite; color, greyish-black—almost black; lustre resinous; hard and firm; fracture uneven; does not soil the fingers; powder dark brown, inclining to blackish-brown; it communicates only a just perceptible yellowish tinge to a boiling solution of caustic potash; resists exposure to the air; in appearance it resembles some varieties of coal of the Carboniferous system.

Analysis of.

Analysis by fast coking gave:

Hygroscopic water	1·05
Volatile combustible matter	34·38
Fixed carbon	54·01
Ash	10·56
	100·00
Coke, per cent	64·57
Ratio of volatile combustible matter to fixed carbon	1 : 1·57

It yields—by fast coking a firm, compact coke, in concentric layers, in which the form of the particles of coal from which it has been derived is perfectly obliterated; the gases evolved during coking burnt with a yellow, luminous, smoky flame. The ash has a pale, dull yellowish-white color; exposed to a bright red heat, it

does not become agglutinated, at a most intense red heat it becomes slightly fritted.

66.—Coal—From a seam near Ya-koun River,—which flows into Massett Inlet—about twelve miles to the north of Skidegate Inlet, Graham Island, Queen Charlotte Islands, British Columbia. Seam said to be eighteen feet thick. Geological position—Cretaceous. Coal from Ya-koun River, Graham Island, QueenCharlotte Islands.

Structure, compact; hard and firm; color, black; lustre, resinous, in parts brilliant; fracture uneven, occasionally somewhat conchoidal; it is, here and there, intersected by thin plates of gypsum and calcite, as also by a few films of pyrite; does not soil the fingers; powder dark brown, inclining to blackish-brown; it communicates a just perceptible brownish-yellow tinge to a boiling solution of caustic potash; resists exposure to the air; in appearance it closely resembles some varieties of coal of the Carboniferous system.

Analyses by slow and fast coking gave: Analyses of.

	Slow coking.	Fast coking.
Hygroscopic water	2·65	2·65
Volatile combustible matter	30·59	38·19
Fixed carbon	61·33	53·73
Ash	5·43	5·43
	100.00	100·00
Coke, per cent	66.76	59·16
Ratio of volatile combustible matter to fixed carbon	1 : 2·00	1:1·41

It yields—by slow coking, a non-coherent coke—by fast coking, a firm, compact coke, in concentric layers, in which the form of the particles of coal from which it has been derived is entirely obliterated; the gases evolved during coking burnt with a yellow, luminous, smoky flame. Color of the ash, light reddish-white—when exposed to a bright red heat it remains unaffected, at a most intense red heat it becomes slightly fritted.

This coal agrees very closely in composition with that of the Newcastle seam, Wellington Mine, Vancouver Island, analyses of which are given in Report of Progress for 1882-84, p. 37 M., specimen No. 33.

67.—Coal—From Ki-uk River, the mouth of which is about three miles south of Beaver Harbor, Vancouver Island, British Columbia. Seam six inches thick. Geological position—Cretaceous. Coal from Ki-uk River, Vancouver Island.

Collected by Dr. G. M. Dawson, and referred to by him in Annual Report for 1886, p. 62 B.

Structure, for the most part, tolerably fine lamellar, with an intervening broad layer of compact, homogeneous, velvet-black, jet-like material, and an occasional interposed layer of mineral charcoal; apart from the latter, does not soil the fingers; it is intersected by numerous films of calcite; hard and firm; powder dark brown, inclining to blackish-brown; it communicates a pale brownish-yellow color to a boiling solution of caustic potash; resists exposure to the air.

Analysis of.

Analysis by fast coking gave:

Hygroscopic water	3·68
Volatile combustible matter	39·29
Fixed carbon	47·03
Ash	10·00
	100·00
Coke, per cent	57·03
Ratio of volatile combustible matter to fixed carbon	1 : 1·19

It yields—by fast coking, a firm, coherent coke; the gases evolved during coking burnt with a yellow, luminous, smoky flame. The ash has a light reddish-grey color—exposed to a bright red heat it becomes slightly fritted, at a most intense red heat it forms a more or less vitrified mass.

Coal from Suquash, Vancouver Island.

68.—Coal—From Suquash, north-east end of Vancouver Island, British Columbia. From site at which coal was mined by the Hudson Bay Company. There are two seams at this locality, the upper—that from which the present specimen was taken—having a thickness of from one to two feet, and which is separated from the lower seam of some six inches, by a parting of about one foot of soft shale. Geological position—Cretaceous. Collected by Dr. G. M. Dawson, and referred to by him in Annual Report for 1886, p. 62 B.

Structure, on the whole, moderately fine lamellar, of grayish-black color and dull lustre, with occasional somewhat coarse layers of shining, velvet-black coal; it is, here and there, intersected by a few films of calcite, and contains, in parts, a little lemon-yellow subtransparent resin; hard and firm; fracture uneven; powder dark brown, inclining to blackish-brown; it communicates a brownish-yellow color to a boiling solution of caustic potash; resists exposure to the air.

Analysis by fast coking gave: Analysis of.

Hygroscopic water	5·03
Volatile combustible matter	41·51
Fixed carbon	46·52
Ash	6·94
	100·00
Coke, per cent	53·46
Ratio of volatile combustible matter to fixed carbon	1 : 1·12

It yields—by fast coking, a moderately firm coke; the gases evolved during coking burnt with a yellow, luminous, smoky flame. The ash has a light bluish-grey color—exposed to a bright red heat it becomes slightly fritted, at a most intense red heat it readily fuses to a vitrified mass.

69.—Coal—From a small stream, three-quarters of a mile due south of mouth of Klik-si-wi River, north-west coast of Vancouver Island, British Columbia. Seam sixteen inches thick. Geological position—Cretaceous. Collected by Dr. G. M. Dawson, and referred to by him in Annual Report for 1886, p. 62 B. Coal from Klik-si-wi River, Vancouver Island

Structure, tolerably fine lameller—compact; color black; lustre resinous; hard and firm; fracture uneven; does not soil the fingers; powder dark brown, inclining to blackish-brown; it communicates a brownish-yellow color to a boiling solution of caustic potash; on exposure to the air it becomes, in parts, incrusted with a white efflorescence, resulting from the oxidation of iron pyrites; in appearance, it is not unlike some varieties of coal of the Carboniferous system.

Analysis by fast coking gave: Analysis of.

Hygroscopic water	3·65
Volatile combustible matter	42·23
Fixed carbon	39·84
Ash	14·28
	100·00
Coke, per cent	54·12
Ratio of volatile combustible matter to fixed carbon	1 : 0·94

It yields—by fast coking, a coherent but tender coke; the gases evolved during coking burnt with a yellow, luminous, smoky flame; color of the ash, reddish-brown—exposed to a bright red heat it becomes slightly fritted, at a most intense red heat it forms a more or less vitrified mass.

Semi-anthracite from Marsh's Mine, Rocky Mountains.

70.—Semi-anthracite—From Marsh's mine, about one and a-half miles south of Bow River, at Gap siding, Rocky Mountains, District of Alberta, N.W.T. There are two seams, an upper about twelve feet thick, and a lower about ten feet thick, separated by about fifty feet of shales and sandstone. Geological position—Cretaceous. Collected by Mr. R. G. McConnell, and referred to in Annual Report for 1885, p. 133 B.

Material of upper seam:

Upper seam.

Structure compact, highly contorted, shows slickensides in an eminent degree; made up of alternating layers of a greyish-black, dull, and jet-black coal of brilliant lustre; brittle; fracture, on the whole, uneven, that of the more lustrous layers conchoidal; does not soil the fingers; the specimen examined was hard and firm; powder black; it communicated only a just perceptible yellowish tinge to a boiling solution of caustic potash; resists exposure to the air.

Analysis of.

Analysis by fast coking gave:

Hygroscopic water	0·70
Volatile combustible matter	11·03
Fixed carbon	79·78
Ash	8·49
	100·00

Ratio of volatile combustible matter to fixed carbon 1 : 7·23

It yields a non-coherent coke; when heated in a covered crucible it evolves a small amount of yellowish, somewhat luminous, almost smokeless flame. The ash, which is white, does not agglutinate at a bright red heat, and at a most intense red heat becomes only very slightly fritted.

Lower seam.

71.—Material of lower seam:

Structure foliated, crumpled—made up of layers of dull greyish-black material, consisting, apparently, of carbonaceous shale and velvet-black coal of brilliant lustre; shows slickensides; does not soil the fingers; hard and firm; at a first glance, might readily be mistaken for a fuel of excellent quality.

Analysis of.

Analysis by fast coking gave:

Hygroscopic water	1·02
Volatile combustible matter	7·24
Fixed carbon	36·16
Ash	55·58
	100·00

NATURAL WATERS.

1.—Water from one—that usually referred to as the principal spring—of the thermal springs at Banff, District of Alberta, North West Territory. Collected by Mr. R. G. McConnell. Water from thermal spring at Banff, District of Alberta, N.W.T.

Referring to this spring Mr. McConnell says—"The water has a temperature of 111°F. in summer, but it is said to rise to 119°F. in winter. The lower temperature in summer may be caused by the water being affected to some extent by the surface drainage, which is more active at that season. It has a regular flow, and is forced up in large quantities through an aperture several inches in diameter."

Mr. Frank D. Adams has made an analysis of this water and with the following results:—

At the time of examination it contained a certain amount of suspended and sedimentary matter, this for 1000 parts, by weight, of the water amounted to 0·0288, and was found to be composed of a dark colored sand, a portion of which consisted of minute grains of magnetic iron-ore, some argillaceous and vegetable matter, small quantities of carbonates of iron, lime, and magnesia, together with a very small amount of sulphate of lime. The filtered water had a specific gravity, at 15·5°C., of 1000·99. It was colorless, even when viewed in a column two feet in length, was devoid of odor and any marked taste; reaction, faintly alkaline. 1000 parts, by weight, of the water, at 15·5°C., contained :—

Potassa	·0052
Soda	·0097
Lime	·2960
Magnesia	·0690
Alumina (very small amount)	undet.
Ferrous oxide	·0008
Chlorine	·0067
Sulphuric adid	·4784
Carbonic acid	·1454
Silica	·0398
Organic matter	trace
	1·0510
Less oxygen equivalent to chlorine	·0015
	1·0495

The foregoing acids and bases are most probably combined in the water as follows:

(Carbonates being calculated as mono-carbonates, and all the salts estimated as anhydrous)

Water from thermal spring at Banff, District of Alberta, N.W.T., cont.

Chloride of sodium	·0110
Sulphate of soda	·0089
" potassa	·0096
" magnesia	·2070
" lime	·5627
Carbonate of lime	·1148
" iron	·0013
Alumina	undet.
Silica	·0398
Organic matter	trace.
	·9551

Total dissolved solid matter, by direct experiment, dried at 180°C., 0·9743.

Carbonic acid, half-combined	·0510
" , free	·0434
	1·0495

An Imperial gallon of the water—at the aforementioned temperature—would contain :—

(Carbonates calculated as anhydrous bi-carbonates, and the salts without their water of crystallisation.)

	Grains.
Chloride of Sodium	0·771
Sulphate of soda	0·624
" potassa	0·673
" magnesia	14·504
" lime	39·428
Bi-carbonate of lime	11·583
" iron	0·126
Alumina	undet.
Silica	2·789
Organic matter	trace.
	70·498
Carbonic acid, free	3·041
	73·539

The water was examined for lithia, iodine, and bromine, but no other constitutents. Distinct evidence was obtained of the presence of lithia. Iodine and bromine were not detected: this does not necessarily imply that they are not present in the water, inasmuch as the amount of water operated on was far less than would be required for the detection of traces, or even very small quantities of these substances.

2.—From a spring in the vicinity of the Belvedere iron mine, lot eight

of the ninth range of Ascot, Sherbrooke county, Province of Quebec. Examined for Mr. E. Clark.

Water from a spring near Belvedere iron mine, Ascot, Sherbrooke county, P.Q.

Mr. E. B. Kenrick made a qualitative examination of this water and found it to contain:—

Potassa	trace.
Soda	small proportion.
Lime	rather large proportion.
Magnesia	rather large proportion.
Ferrous oxide	trace.
Sulphuric acid	large proportion.
Carbonic acid	small proportion.
Silica	trace.
Chlorine	small proportion.

Total dissolved saline matter, dried at 180°C., equalled 0·0746 parts in 1000.

IRON ORES.

1.—Red hematite from Mr. W. McDonald's farm near Avondale Post Office, about one hundred yards north of T roads at the house, on the west side of the main road, Pictou county, Nova Scotia.

Hematite from near Avondale Post Office, Pictou county, N.S.

The sample, which was collected by Mr. Hugh Fletcher, and consisted of picked specimens, weighed five pounds. A fair average of the same was found, by Mr. E. B. Kenrick, to contain:—

Metallic iron	33·76 per cent.

2.—Magnetic iron ore from the vicinity of Kinnear's Mills, township of Leeds, Megantic county, Province of Quebec. Examined for Mr. J. H. Bartlett.

Magnetite from vicinity of Kinnear's Mills, Megantic county, P.Q.

The sample consisted of an association of fine crystalline magnetite and hematite, through which was disseminated a large amount of a siliceous gangue and some iron-pyrites. Weight of specimen, about seven and a-half pounds. Mr. E. B. Kenrick found it to contain:—

Metallic iron	37·23 per cent.
Titanium dioxide	none.
Insoluble matter	44·31 per cent.

3.—A specular schist from lot seven, range nine of Sutton, Brome county, Province of Quebec.

Specular schist from Sutton, Brome county, P.Q.

A sample of this material, forwarded to the Survey for examination, was found by Mr. F. D. Adams to contain about forty per cent. of insoluble matter, and gave a very strong re-action for titanic acid.

Magnetite from lot 16, range 2 of Wollaston, Hastings county, Ont.

4.—Magnetic iron-ore from lot sixteen, range two of Wollaston, Hastings county, Ontario. This and the two following specimens were examined for Mr. W. Jenkins. The determinations were made by Mr. E. B. Kenrick. It contained:—

Metallic iron	26·94 per cent.
Titanium dioxide	none.

Magnetite from lot 15, range 2 of Wollaston, Hastings county, Ont.

5.—Magnetic iron-ore from lot fifteen, range two of Wollaston, Hastings county, Ontario.

A fine crystalline magnetite: it contained:—

Metallic iron	56·50
Titanium dioxide	none.

Magnetite from lots 9 and 10, range 15 of Wollaston, Hastings county, Ont.

6.—Magnetic iron-ore from lots nine and ten, range fifteen of Wollaston, Hastings county, Ontario.

A fine crystalline magnetite: it contained:—

Metallic iron	28·42 per cent.
Titanium dioxide	trace.

Magnetite from Bedford, Frontenac county, Ont.

7.—Magnetic iron-ore from lot twenty-eight, range four of Bedford, Frontenac county, Ontario. Examined for Mr. W. Davis.

A coarse crystalline magnetite. Determinations by Mr. E. B. Kenrick gave:

Metallic iron	62·98 per cent.
Titanium dioxide	none.

Magnetite from South Sherbrooke, Lanark county, Ont.

8.—Magnetic iron-ore from lot nineteen, range three of South Sherbrooke, Lanark county, Ontario. Examined for Mr. W. A. Allan.

Small crystals of apatite were disseminated through portions of this sample. A fair average of thirty-seven pounds of this ore was found, by Mr. E. B. Kenrick, to contain:—

Metallic iron	40·81 per cent.
Titanium dioxide	none.

Magnetite from Carlow, Hastings county, Ont.

9.—Magnetic iron-ore from a deposit occurring on the north halves of lots six and seven, range sixteen of Carlow, Hastings county, Ontario. The examination was conducted by Mr. F. D. Adams.

The sample received was made up of fragments which differed materially in appearance, some consisting, apparently, of very pure, others of a very impure ore. The former were separated from the latter, thus dividing the original material into two portions—A, and B. Portion A, consisting of the apparently pure fragments, constituted 36·42 per cent. of the original sample. On

closely examining the various fragments composing it, it was found that whereas some consisted of a coarsely crystalline magnetite, strongly magnetic, and having a distinct octahedral cleavage, the remainder were not at all magnetic and proved to consist of ilmenite. This portion contained :—

Metallic iron	68·47 per cent.
Titanium dioxide	undet.

Portion B, contained a large amount of rock matter. Some of the fragments consisted, apparently, of gneiss carrying more or less magnetite. Analysis gave :—

Metallic iron	34·16 per cent.
Titanium dioxide	trace.

The insoluble matter amounted to over forty per cent. Calculation showed the sample, as received, to contain :—

Metallic iron	46·66 per cent.
Titanium dioxide	undet.

10.—Magnetic iron-ore from the vicinity of Little Gull Lake, District of Thunder Bay, Lake Superior, Ontario. Collected by Mr. E. D. Ingall. There were two specimens, taken from different points. The examinations were made by Mr. E. B. Kenrick. Magnetite from Little Gull Lake, District of Thunder Bay, Ont.

The one specimen was strongly magneti-polar. It contained :

Metallic Iron	39·76 per cent.
Titanium dioxide	none.

The other was also found to possess polarity, but in a far less degree than the one just alluded to. Determinations gave :

Metallic iron	45·57 per cent.
Titanium dioxide	none.

11.—Hematite from Big Island, Lake Winnipeg, Manitoba. Examined for Mr. F. Proudfoot. Hematite from Big Island, Lake Winnipeg, Man.

This specimen contained a good deal of finely disseminated iron-pyrites, also a large amount of a calcareous and siliceous gangue. Determinations—by Mr. F. D. Adams—of the more important constituents, gave :

Ferric oxide	50·343
Phosphoric acid	0·009
Sulphur	2·026
Insoluble matter	22·330
Water, hygroscopic	0·644
Metallic iron	35·240
Phosphorus	0·004
Sulphur	2·026

Magnetite from Albany River.

12.—Magnetic iron-ore from the Albany River, two and a-half miles below the junction of the Etow-i-ma-mi. Collected by Dr. R. Bell.

A very fine-granular, almost compact, dark bluish-grey magnetite. Agreeably with the results of determinations made by Mr. E. B. Kenrick, it contained:—

Metallic iron	42·09 per cent.
Titanium dioxide	none.

Hematite from near Spence's Bridge, Thompson River, B.C.

13.—Hematite, var. specular iron, from the vicinity of Spence's Bridge, Thompson River, Cascade Range, British Columbia. Received from Mr. James Crawford. Determinations by Mr. E. B. Kenrick, gave:

Metallic iron	33·13 per cent.
Titanium dioxide	none.

Gold and Silver Assays.

GOLD AND SILVER ASSAYS.

Province of Nova Scotia.

Assays Nos. 1 and 2 were conducted by Mr. F. D. Adams.

Province of Nova Scotia.

1.—From North Bend, East Bay, Cape Breton county. Examined for Mr. E. T. Moseley.

It consisted of a dark-brown zinc-blende, coated with ferric hydrate and other decomposition products. Weight of specimen, four ounces. It was found to contain:

Gold	none.
Silver	trace.

2.—Said to have come from near Truro, Colchester county. Examined for Mr. E. A. Charters.

It consisted of galena in association with a dark-brown limestone. The former constituted, approximately, four-fifths, by weight, of the whole. Weight of specimen, ten and a-half ounces.

It contained neither gold nor silver.

3.—From St. Ann's Mountain at Big Bras d'Or, Victoria county, Cape Breton. Examined for Mr. J. McPherson.

A greyish-white sub-translucent quartz, carrying a somewhat large amount of iron-pyrites, together with some magnetite: the whole was more or less stained with ferric hydrate. Weight of specimen, seven and a-half ounces. Assays, by Mr. R. A. A. Johnston, gave:

Gold	trace.
Silver	none.

Gold and Silver Assays, cont.

Province of New Brunswick.

Province of New Brunswick

4.—From the "Mineral Vale" property, parish of Alma, Albert county. Examined for Mr. E. A. Charters.

A finely-crystalline galena, together with a little copper-pyrites, disseminated through a dolomitic gangue. Weight of specimen, fifteen and three-quarter ounces. Mr. E. B. Kenrick found it to contain:

Gold..... trace.
Silver..... 1·458 ounce to the ton of 2,000 lbs.

Province of Quebec.

Assays Nos. 5 *to* 8 *and* 22 *to* 27 *inc., were conducted by Mr. E. B. Kenrick—Nos.* 9 *to* 14 *inc., by Mr. R. A. A. Johnston, and Nos.* 16 *to* 21 *inc., by Mr. F. D. Adams.*

Province of Quebec.

5.—From one of numerous veins in the vicinity of the town of Sherbrooke, Sherbrooke county.

It consisted of an association of iron-pyrites, galena, and quartz. Weight of specimen, ten and a-half ounces. Assays gave:

Gold..... trace.
Silver..... 9·479 ounces to the ton of 2,000 lbs.

6.—From the township of Litchfield, Pontiac county. Examined for Mr. H. K. Egan.

A coarsely crystalline galena, in association with a very small quantity of calcite. Weight of specimen, three and a-quarter ounces. It contained:

Gold..... none.
Silver..... 2·188 ounces to the ton of 2,000 lbs.

7.—From range nine, lot twenty-four of Cranbourne, Dorchester county. Quartz, in association with a dark bluish-grey shale; it contained a little iron-pyrites and magnetite, and was in parts stained with ferric hydrate. Weight of specimen, thirteen ounces.

It contained neither gold nor silver.

8.—From Onslow, Pontiac county.

A coarsely crystalline galena, in association with a small quantity of calcite. Weight of specimen, nine and a-half ounces. It was found to contain:

Gold..... none.
Silver..... 0·729 of an ounce to the ton of 2,000 lbs.

Gold and Silver Assays, cont.

Province of Quebec, cont.

9.—From lot twelve, range one, N. E. St. Francis, Beauce county.

A white sub-translucent quartz, in association with chloritic schist; it contained a good deal of iron-pyrites, also a small quantity of galena, and was more or less stained with ferric hydrate. Weight of specimen, one pound one ounce. Assays showed it to contain:

Gold	0·117 of an ounce to the ton of 2,000 lbs.
Silver	none.

10.—From the Coulonge River, about eighteen miles up.

A greyish-white to white sub-translucent quartz, carrying a somewhat large amount of zinc-blende, and, here and there, a few specks of galena and magnetic-pyrites. It was in parts stained with ferric hydrate. Weight of specimen, one pound two ounces.

It contained neither gold nor silver.

11.—From near the headwaters of the Abitibi branch of the Ottawa River, eight miles south of height of land. Examined for Mr. C. C. Farr.

An association of copper-pyrites and quartz. Weight of specimen, one and a-half ounce. It contained:

Gold	trace.
Silver	none.

12.—From R. N. Klocks and Company's limit, north shore of Lac des Quinze. Examined for Mr. C. C. Farr.

An association of iron-pyrites, magnetic-pyrites, and translucent quartz. Weight of specimen, four and a-half ounces. Assays gave:

Gold	trace.
Silver	none.

13.—From the north-east end of Lac des Quinze.

Consisted of iron-pyrites in a gangue of white and greyish-white sub-translucent quartz, in parts coated with with ferric hydrate. Weight of specimen, eight ounces. Assays showed it to contain:

Gold	trace.
Silver	trace.

14.—From lot six, range eleven, of Whitton, Compton county.

A full description of this material will be found under Miscellaneous Examinations, examination No. 4, where it is referred to as "the bulk of the material." It was found to contain:

Gold	trace.
Silver	none.

Gold and Silver Assays, cont.

Province of Quebec, cont.

15.—From the so-called Bothwell gold mine, range nine, lot seventeen, of Buckingham, Ottawa county. Taken from a depth of about seven or eight feet. This, and the following specimen were examined for Mr. W. A. Allan.

It consisted of an association of quartz and felspar, together with a little pyroxene and garnet, a trifling amount of apatite, some graphite and iron-pyrites. Weight of specimen, four pounds ten ounces.

It contained neither gold nor silver.

16.—From the same locality and opening as the preceding specimen, but from a depth of abont twenty feet.

This cousisted of a somewhat coarsely crystalline rock, composed of quartz, grey felspar, a good deal of calcite and a little pyroxene. It contained a large quantity of pyrite and hydrated peroxide of iron; also, a little pyrrhotite. Weight of specimen, one pound.

It contained neither gold nor silver.

17.—From lot nineteen, range five of Buckingham, Ottawa county. Examined for Mr. L. P. Labouglie.

A grey garnetiferous gneiss, through which was disseminated a little graphite, carrying a somewhat large amount of iron-pyrites; the latter constituting a band in the rock. Weight of specimen, two and a-half pounds. It contained:

Gold	trace.
Silver	none.

18.—This, and the two following specimens were stated, by Mr. W. Macintosh, for whom they were examined, to have come from the vicinity of Whitefish Lake, Ottawa county.

It consisted of a very fine-grained steel-grey ore, consisting of an intimate mixture of zinc-blende, galena, copper-pyrites, quartz and calcite. The copper-pyrites was present only in very small amount; the galena constituted about 13·8 per cent., by weight, of the whole. Weight of specimen, four pounds six ounces. Assays showed it to contain:

Gold	distinct trace.
Silver	13·125 ounces to the ton of 2,000 lbs.

19.—A white translucent quartz, in association with a small quantity of a dark, somewhat micaceous schist; it held a small amount of coarsely crystalline iron-pyrites. Weight of specimen, three pounds twelve ounces.

It contained neither gold nor silver.

Gold and Silver Assays, cont.

Province of Quebec, cont.

20.—Consisted of greyish quartz, carrying a good deal of iron-pyrites; also, a little galena and zinc-blende. Half of one of the fragments consisted of an impure grey limestone, apparently the wall rock. Weight of specimen two pounds fifteen and a-half ounces. Assays gave:

Gold..... .....0·058 of an ounce to the ton of 2,000 lbs.
Silver.....0·262 " " "

21.—From lot ten, range four of Calumet, Pontiac county.

A more or less intimate association of zinc-blende and galena, together with small quantities of iron-pyrites. The proportion of the two latter, more especially the galena, to the former, varied greatly in different specimens. A fair average of numerous specimen, was found, on assay, to contain:

Gold.....trace.
Silver.....11·666 ounces to the ton of 2,000 lbs.

22.—This, and the four following specimens, are from quartz veins occurring on a hill on the north side of the Ottawa River, and opposite to the village of Mattawa. They were collected, at the instance of Dr. R. Bell, by Mr. A. E. Barlow and in such wise as to thoroughly represent the respective veins from which they were taken.

The material from the first vein, which occurs about one and a half miles north-east of the Mattawa village, consisted of a translucent quartz in association with a little red and white felspar. Weight of specimen, twelve ounces.

It contained neither gold nor silver.

23.—From a vein about one hundred feet from, and running parallel with, the last mentioned. Width of vein, about seven feet.

A translucent quartz. Weight of specimen, one pound thirteen ounces.

It contained neither gold nor silver.

24.—From a vein occurring about half a mile W. 15° N. of that from which the last mentioned specimen was taken. Strike of vein about S. 55° W.

Translucent quartz in association with a little felspar. Weight of specimen, eight pounds fourteen ounces.

It contained neither gold nor silver.

25.—From a vein about two feet wide, of much the same character and having the same strike as the one last referred to.

Consisted of a translucent quartz in association with a little felspar. Weight of specimen, four pounds nine ounces.

It contained neither gold nor silver.

26.—From a vein occurring at the back of the hill.

It consisted of a translucent quartz, through which was disseminated small flakes of a gold-yellow colored mica. Weight of specimen, four and three-quarter ounces.

It contained neither gold nor silver.

27.—From an opening on the north-west claim of the Mattawa Gold Mining Company. The claim is three miles due north of the village of Mattawa. Collected by Dr. R. Bell.

A translucent quartz with which was associated a little felspar, and in some instances a micaceous schist. Weight of specimen, five pounds.

It contained neither gold nor silver.

Province of Ontario.

Assays Nos. 28 *to* 49 *inc., were conducted by Mr. E. B. Kenrick —Nos.* 50 *to* 53 *inc., by Mr. R. A. A. Johnston, and Nos.* 54 *to* 56 *inc., by Mr. F. D. Adams.*

28.—This, and the two following specimens were collected by Dr. R. Bell.

From main opening, McCool's Mill location, Mattawa Gold Mining Company, about half a mile north of McCool's Mill, Mattawan River, and three miles west of Mattaw village, district of Nipissing.

It consisted of translucent quartz in association with some felspar. Weight of specimen, three pounds six ounces.

It contained neither gold nor silver.

29.—From the south opening, McCool's Mill location, Mattawa Gold Mining Company, about thirty feet south-west of the opening whence the last mentioned specimen was taken.

A translucent quartz. Weight of specimen, three pounds.

It contained neither gold nor silver.

30.—From a vein running N. 45° E. (mag.), and about two chains north-west of the opening last referred to.

Consisted of a translucent quartz in association with a little felspar. Weight of specimen, two and three-quarter pounds.

It contained neither gold nor silver.

Gold and Silver Assays, cont.

Province of Ontario, cont.

31.—From lot three, range one of the township of Snider, district of Algoma. Examined for Mr. T. M. Kirkwood.

A moderately coarse crystalline galena in the form of more or less contorted layers, having an average thickness of about a-quarter of an inch. Assays gave:

Gold.....none.
Silver.....5·104 ounces to the ton of 2,000 lbs.

32—From a ten feet vein at the northern end of Lake Temagami, district of Nipissing. Received from Mr. E. B. Haycock.

It consisted of iron-pyrites through which was disseminated a little quartz and calcite. Weight of specimen, seven and a-quarter ounces. It was found to contain:

Gold.....trace.
Silver.....none.

33.—From about six miles from Gravel River Station on the line of the Canadian Pacific Railway, district of Thunder Bay. Vein eighteen inches wide. Received from Mr. Hugh Wilson.

A coarsely crystalline galena in a gangue consisting almost exclusively of quartz. Weight of specimen, one and a-quarter ounce. It contained:

Gold.....none.
Silver.....1·094 ounce to the ton of 2,000 lbs.

34.—This, and the following fifteen specimens were collected by Mr. E. D. Ingall.

From Jarvis Island, north-west shore of Lake Superior, between Thunder Bay and Pigeon River.

An association of calcite and a greyish-green chloritic mineral, through which was disseminated a little iron-pyrites and zinc-blende. Weight of specimen, ten and a-quarter ounces. It was found to contain:

Gold.....none.
Silver.....0·350 of an ounce to the ton of 2,000 lbs.

35.—This, and the two following specimens are from location 97 T., Rabbit Mountain district.

Zinc-blende in a gangue consisting of a dark grey shale, calcite and some fluorite. The gangue constituted but a small proportion, by weight, of the whole. Weight of specimen, one pound eleven ounces. It was found, on assay, to contain:

Gold.....trace.
Silver.....336·700 ounces to the ton of 2,000

36.—From upper slope.

It consisted of zinc-blende and a trifling amount of iron-pyrites, in a gangue of calcite with a little fluorite. Weight of specimen, seven ounces. Assays gave:

Gold.....trace.
Silver.....none.

37.—From bottom of shaft.

An association of a dark grey shale, quartz and some fluorite, carrying small quantities of zinc-blende and a little galena. Weight of specimen, six and a-half ounces.

It contained neither gold nor silver.

38.—From a vein on location 264 T., Whitefish Lake.

An association of quartz and calcite, with some shale and a little fluorite, carrying a trifling quantity of zinc-blende. Weight of specimen, two pounds five ounces. It was found to contain:

Gold.....none.
Silver.....1·867 ounces to the ton of 2,000 lbs.

39.—From a vein on location 176 T., Whitefish River.

It consisted of calcite, in association with a little quartz and fluorite, carrying small quantities of zinc-blende and a little galena. Weight of specimen, thirteen ounces.

It contained neither gold nor silver.

40.—From location R. 110, Whitefish Lake.

An association of calcite, shale, and small quantities of fluorite, carrying a little iron-pyrites and galena. Weight of specimen, eight and three-quarter ounces.

It contained neither gold nor silver.

41.—From location R. 235, Silver Mountain district.

An association of quartz and calcite. Weight of specimen, fifteen and a-quarter ouuces.

It contained neither gold nor silver.

42.—From a vein on location 95 T., Silver Mountain district.

It consisted of calcite in association with a little fluorite, and contained, here and there, a trifling amount of silver-glance. Weight of specimen, five ounces. Assays gave:

Gold.....none.
Silver.....2·567 ounces to the ton of 2,000 lbs.

Gold and Silver Assays, cont.

Province of Ontario, cont.

43.—From a vein on Tchiatay's location, Silver Mountain district.

It consisted of calcite together with a little fluor, carrying small quantities of zinc-blende and some galena. Weight of specimen, fourteen ounces. It was found to contain:

Gold	trace.
Silver	none.

44.—From a vein on Woodside's location, Silver Mountain district.

An association of a white translucent quartz with a little shale, calcite, and fluorite, carrying small quantities of zinc-blende. Weight of specimen, eleven and a-half ounces.

It contained neither gold nor silver.

45.—From Silver Mountain vein, from test pit.

A dark grey shale with some quartz and a little fluorite, carrying a trifling amount of zinc-blende and silver-glance. Weight of specimen, two pounds eleven ounces. Assays showed it to contain:

Gold	trace.
Silver	353·442 ounces to the ton of 2,000 lbs.

46.—From Silver Mountain vein, No. 2 tunnel, breast.

An association of calcite and a dark grey shale with some quartz and fluorite, carrying a little iron-pyrites. Weight of specimen, fifteen ounces.

It contained neither gold nor silver.

47.—From Silver Mountain vein, No. 2 tunnel, near crosscut.

An association of calcite and shale together with some quartz and fluorite, carrying a little iron-pyrites, zinc-blende, and silver-glance. Weight of specimen, seventeen pounds. It contained:

Gold	district trace.
Silver	102·083 ounces to the ton of 2,000 lbs.

48.—From Osinawe Lake, Seine River district.

A milky white quartz, in association with a greenish-grey chloritic schist: it contained, here and there, a few specks of iron-pyrites and, in parts, cavities lined with ferric hydrate. Weight of specimen, fourteen and three-quarter ounces.

It contained neither gold nor silver.

49.—From Michipicoten Island, Lake Superior.

A white, reddish-white, and grey calcite in association with a

small quantity of an apple-green talcose mineral. Weight of specimen, seven and a-half ounces. It was found to contain :

Gold.....	distinct trace.
Silver.....	0·467 of an ounce to the ton of 2,000 lbs.

50.—From lot two, range five, of Snider, district of Algoma. Examined by Mr. J. McCormick.

A greyish-white translucent to snb-transparent quartz, in association with a greenish chloritic mineral, carrying small quantities of iron-pyrites. It was more or less stained and coated with ferric hydrate. Weight of specimen, six pounds thirteen ounces. Assays gave:

Gold.....	trace.
Silver.....	none.

51.—From the Thompson vein, location H., township of McIntyre, Thunder Bay, Lake Superior. Examined for Mr. W. A. Allan.

A white sub-translucent quartz, in association with a dark-grey rock. It was slightly stained with ferric hydrate, and contained a little iron-pyrites. Weight of specimen. two and three-quarter pounds. Assays showed it to contain :

Gold.....	trace.
Silver.....	none.

52.—From the township of Escott, Leeds county. Examined for Mr. T. Storey.

It consisted of iron-pyrites with a somewhat large amount of intermixed ferric hydrate. Weight of specimen, ten ounces. It was found, on assay, to contain :

Gold.....	trace.
Silver.....	trace.

53.—From about five and a half miles south of Kinmount, Peterborough county.

An association of iron-pyrites and magnetic pyrites in a felspathic gangue: the latter constituted but a small proportion, by weight, of the whole. Weight of specimen, five and a-half ounces. Assays gave :

Gold.....	distinct trace.
Silver.....	none.

54.—From the south-east corner of township 94, district of Algoma. Examined for Mr. W. Russel.

Gold and Silver Assays, cont.

Province of Ontario, cont.

A greyish translucent quartz associated with a small quantity of a light colored micaceous mineral and holding a little iron-pyrites. Weight of specimen, two pounds. It contained:

Gold	trace.
Silver	none.

55.—From the vicinity of Sudbury Station on the line of the Canadian Pacific Railway, district of Nipissing.

Quartz carrying a small amount of copper-pyrites and magnetic pyrites. Weight of specimen, four and three-quarter ounces. It was found to contain:

Gold	distinct trace.
Silver	0·414 of an ounce to the tou of 2,000 lbs.

56.—From lot sixteen, range three of the township of Dalhousie, county of Lanark. Examined for Mr. David MacLean.

An association of galena, calcite, and barite. The calcite constituted 17·7 per cent., and the barite about 40 per cent. of the material. Weight of specimen, two and three-quarter ounces. Assays showed it to contain:

Gold	none.
Silver	1·951 ounce to the ton of 2,000 lbs.

District of Keewatin.

District of Keewatin.

57.—From an island eighteen miles south-west of Rat Portage, Lake of the Woods. Examined for Mr. J. C. Gough.

It consisted of quartz stained, and more or less coated, with ferric hydrate, with here and there a few specks of galena and iron-pyrites. Weight of specimen, nine and a-half pounds. Assays, by Mr. E. B. Kenrick, showed it to contain:

Gold	0·350 of an ounce to the ton of 2,000 lbs.
Silver	0·293 " " "

North-West Territory.

Assays Nos. 58 *to* 64 *inc., were conducted by Mr. F. D. Adams.*

North-we Territory.

58.—This, and the following five specimens were collected by Dr. G. M. Dawson.

From Hoo-che-koo Bluff, Lewes River, a branch of the Yukon.

An exceedingly fine grained, brown weathering, argillaceous rock, containing a little disseminated copper-pyrites and much stained with green carbonate of copper. The rock is traversed by

thin veins of white calcite. Weight of specimen, eleven ounces. Assays gave:

Gold	minute trace.
Silver	0·088 of an ounce to the ton of 2,000 lbs.

59.—From Frances Lake, head of Liard River.

A greyish translucent quartz, somewhat stained with ferric hydrate and containing a little chloritic matter and iron-pyrites. Weight of specimen, ten ounces. It contained:

Gold	minute trace.
Silver	none.

60.—From Frances Lake, head of Liard River, from another exposure.

A greyish translucent quartz, traversed by small veins and strings of a very ferruginous dolomite, and associated with a little chloritic matter. Weight of specimen, one pound one ounce. Assays showed it to contain:

Gold	trace.
Silver	none.

61.—From Finlayson River, head of Liard River.

A grey translucent quartz, more or less coated with ferric hydrate. The specimen, which was made up of numerous fragments taken from different parts of a very large quartz vein, weighed eleven ounces.

It contained neither gold nor silver.

62.—From Pelly River, head waters of the Yukon.

A very fine grained dark grey siliceous rock, impregnated with mispickel and traversed by small veins of calcite. Weight of specimen, twelve ounces. It was found to contain:

Gold	distinct trace.
Silver	none.

63.—From Tagish or Tahko Lake, Lewes River, a branch of the Yukon.

A very fine grained, somewhat calcareous, greenish-grey, rusty weathering, felsite, through which was disseminated a little magnetic-pyrites. Weight of specimen, one pound seven ounces.

It contained neither gold nor silver.

64.—From a large vein in Red Mountain, Bennett Lake, Lewes River, Collected by Mr. W. Ogilvie.

A rather fine grained granitic rock holding a little magnetic

Gold and Silver Assays, cont.

pyrites. Weight of specimen, one pound two ounces. Assays gave:

Gold	distinct trace.
Silver	none.

Province of British Columbia.

Assays Nos. 69 *to* 112 *inc.*, 122, 123, *and* 136 *to* 159 *inc.*, *were conducted by Mr. E. B. Kenrîck—Nos.* 65 *to* 67 *inc.*, 113, 120, 121, *and* 131 *to* 134 *inc.*, *by Mr. F. D. Adams, and Nos.* 68, 114 *to* 119 *inc.*, 124 *to* 130 *inc.*, 135, 160, *and* 161, *by Mr. R. A. A. Johnston.*

Province of British Columbia.

65.—From one of the Hepburn claims on Idaho Mountain, south-east side of Stump Lake, east side of the Nicola Valley stage road, from eight hundred to one thousand feet above the level of the lake, Nicola Valley, Examined for Senator W. E. Sanford.

It consisted of quartz, in parts honeycombed and more or less stained and coated with yellowish and brownish ochres, carrying small quantities of galena. Weight of specimen, nine and a-half pounds. It was found to contain:

Gold	0·759 of an ounce to the ton of 2,000 lbs.
Silver	406·574 ounces. " " "

66.—From Stump Lake, Nicola Valley.

It consisted of a coarse crystalline galena, through which was disseminated a rather small amount of copper-pyrites and a very small quantity of an indigo-blue sulphide, apparently resulting from the alteration of the copper-pyrites, and allied to covellite, as likewise a little quartz. It contained:

Gold	distinct trace.
Silver	20·339 ounces to the ton of 2,000 lbs.

Two samples of the galena of this specimen, carefully freed from all associated material, were assayed and found to contain:

The first—	Gold	none.
	Silver	32·900 ounces to the ton of 2,000 lbs.
The second—	Gold	none.
	Silver	31·135 ounces to the ton of 2,000 lbs.

The galena from different parts of the specimen is, therefore, not quite constant in its content of silver.

The copper-pyrites carefully freed from associated material, still containing, however, a small quantity of the above mentioned

indigo-blue mineral, which it was found impossible to exclude entirely, gave:

Gold..... distinct trace.
Silver..... 1·600 ounce to the ton of 2,000 lbs.

67.—From the same locality as the last mentioned.

It consisted of a rather fine-grained mixture of galena, iron-pyrites and quartz. One portion of the specimen contained, intimately associated with the quartz, a considerable amount of tetrahedrite. The tetrahedrite, freed from associated minerals, still containing some quartz, however, was assayed and found to contain:

Gold..... 1·823 ounce to the ton of 2,000 lbs.
Silver..... 434·328 ounces " "

The amount of quartz in some of the material employed for assay was estimated and found to amount to 17·475 per cent. The quantities of the precious metals in the pure tetrahedrite would, therefore, be as follows:

Gold..... 2·209 ounces to the ton of 2,000 lbs.
Silver.....526·299 " " "

68.—Also, from Stump Lake, the precise locality was not stated.

It consisted of a white sub-translucent quartz, carrying a considerable quantity of galena: some portions of the specimen were stained with ferric hydrate, and in parts lightly coated with green carbonate of copper. Weight of specimen, two pounds five ounces. Assays showed it to contain:

Gold..... 6·096 ounces to the ton of 2,000 lbs.
Silver..... 90·650 " " "

69.—A specimen of ore, examined on a former occasion, from the property of what was formerly known as the Nicola Milling and Mining Company on Mineral Hill, south-east side of Stump Lake, west side of the Nicola Valley stage road, Nicola Valley, and which consisted of galena in association with tetrahedrite, small quantities of iron-pyrites, copper-pyrites, and a little bornite, in a gangue of quartz, the latter frequently very much honeycombed—the whole presenting a more or less weathered appearance, and for the most part coated with ferric hydrate, in parts with carbonate of lead, and here and there with a little green carbonate of copper, was found to contain:

Gold..... 0·729 of an ounce to the ton of 2,000 lbs.
Silver.....104·271 ounces " "

Gold and Silver Assays, cont.

Province of British Columbia, cont.

70.—This and the following specimen, also examined on a former occasion, is from the southern extremity of Stump Lake, Nicola Valley.

It consisted of a fine crystalline galena, associated with a little iron-pyrites, in a gangue of greyish-white translucent quartz. The metallic sulphides constituted, approximately, one-fourth, by weight, of the whole. Weight of specimen, three and a-half ounces. Assays showed it to contain :

Gold.....	0·729 of an ounce	to the ton of 2,000 lbs.
Silver.....	15·094 ounces	" "

71.—A somewhat coarse crystalline galena, in association with iron-pyrites, copper-pyrites, and a white translucent quartz; the latter constituted but a very small proportion of the whole. Weight of specimen, three and a-quarter ounces. Assays gave :

Gold.....	1·969 ounce	to the ton of 2,000 lbs.
Silver.....	17·063 ounces	" "

Of the following specimens, Nos. 72 to 112 inc., are from the District of Cariboo, and of these Nos. 72 to 109 inc., were collected by Mr. Amos Bowman.

72.—From Little Snow-shoe Creek, Cariboo District. T. Haywood's Discovery claim.

A white translucent quartz, with a little chlorite and a trifling amount of iron-pyrites, with here and there a pseudomorph of limonite after pyrite. It was, in parts, thickly coated with ferric hydrate. Weight of specimen, eight ounces. It was found to contain :

Gold.....	0·408 of an ounce	to the ton of 2,000 lbs.
Silver.....	0·058 "	" "

73.—From the same locality as the last.

It consisted of quartz, in association with a little chlorite, it contained small quantities of iron-pyrites, and was in parts coated with ferric hydrate. Weight of specimen, one pound ten ounces. Assays gave :

Gold.....	distinct trace.
Silver.....	none.

74.—Also, from the same locality as No. 72.

A white sub-translucent quartz, with a little chlorite and a trifling amount of iron-pyrites; the whole was, for the most part,

coated with ferric hydrate. Weight of specimen, three and a-half ounces. It contained:

Gold ..... very distinct trace.
Silver ..... none.

75.—From summit of Harvey Creek trail, Cariboo District.

A white sub-translucent to translucent quartz, in association with small quantities of a chloritic mineral: it was in parts coated with ferric hydrate. Weight of specimen, six and a-half ounces. Assays showed it to contain:

Gold ..... trace.
Silver ..... none.

76.—From Harvey Creek, below Falls, "Ironstone" ledge, Cariboo District.

Siderite, through which was disseminated small quantities of magnetic-pyrites and a little iron-pyrites. Weight of specimen, twelve ounces.

Assays gave:

Gold ..... very distinct trace.
Silver ..... none.

77.—From same locality as the last, about two hundred feet lower down the Creek.

An association of siderite and ankerite, through which was disseminated small quantities of iron-pyrites. The specimen was thickly coated with ferric hydrate. Weight of sample, three pounds eleven ounces.

It contained neither gold nor silver.

78.—From Duck Creek, Borland's ledge, Cariboo District.

A white translucent quartz, through which was disseminated a little iron-pyrites and a small amount of chlorite: it was in parts stained and coated with ferric hydrate. Weight of specimen, one pound fifteen ounces. It contained:

Gold ..... distinct trace.
Silver ..... none.

79.—From North Fork of Quesnel, near mouth of Spanish Creek, Cariboo District.

A white sub-translucent quartz, in parts thickly coated with

Gold and Silver Assays, cont.

Province of British Columbia, cont.

ferric hydrate. Weight of specimen, eight and a-half ounces. It was found to contain:

Gold..... trace.
Silver..... none.

80.—From Duck Creek, three hundred feet above the bridge, Cariboo District.

A white, translucent quartz carrying small quantities of galena, and a little iron-pyrites and zinc-blende: it was in parts coated with ferric hydrate. Weight of specimen, two pounds twelve ounces. It contained:

Gold..... very distinct trace.
Silver..... 3·850 ounces to the ton of 2,000 lbs.

81.—From Cunningham Creek, near Sharp's, Cariboo District.

An association of ankerite and quartz, together with a little chlorite: it was in parts thickly coated with ferric hydrate. Weight of specimen, three and a-half ounces. Assays gave:

Gold..... trace.
Silver..... none.

82.—From Antler Creek, near Porter's cabin, Cariboo District.

It consisted of limestone with intermixed ankerite: the specimen was thickly coated with ferric hyarate. Weight of specimen, three pounds.

It contained neither gold nor silver.

83.—From Antler Creek, below site of old Antler town. Cariboo District.

A white sub-translucent quartz, in parts honeycombed, the cavities holding ferric hydrate; portions of the specimen were also thickly coated with this latter. Weight of specimen, two pounds. It was found to contain:

Gold..... trace.
Silver..... none.

84.—From same locality as the last, but from a different ledge.

A white translucent quartz, in parts slightly honeycombed, the cavities holding ferric hydrate. Weight of specimen, four ounces. Assays gave:

Gold..... distinct trace.
Silver..... none.

85.—From Cunningham Creek, near head of Sharp's Ditch, Cariboo District.

It consisted of iron-pyrites in a gangue of quartz. Weight of specimen, one pound two ounces. Assays showed it to contain:

Gold..... very distinct trace.
Silver..... none.

86.—From Sugar Creek, cañon above Wiley's, upper ledge, Cariboo District.

A white sub-translucent quartz, carrying small quantities of iron-pyrites and a little copper-pyrites: it was for the most part stained with ferric hydrate. Weight of specimen, one pound nine ounces. It contained:

Gold..... distinct trace.
Silver..... none.

87.—From Sugar Creek, cañon above Wiley's, lower ledge.

A white sub-translucent quartz, in association with a small quantity of siderite: it was in parts coated with ferric hydrate. Weight of specimen, twelve ounces. Assays gave:

Gold..... distinct trace.
Silver..... none.

88.—From Sugar Creek, cañon above Wiley's.

A white sub-translucent quartz, with here and there, a little siderite and a trifling amount of chlorite: it was in parts much honeycombed, the cavities holding ferric hydrate. Weight of specimen, one pound one ounce. It contained:

Gold..... distinct trace.
Silver..... none.

89.—From Sugar Creek, at Wiley's cabin.

A white sub-translucent to translucent quartz, with a little chlorite and a trifling amount of zinc-blende: it was for the most part thickly coated with ferric hydrate. Weight of specimen, one and a-quarter pound. Assays showed it to contain:

Gold..... trace.
Silver..... none.

90.—From Sugar Creek, opposite Walker's cabin.

A white sub-translucent quartz, containing small quantities of iron-pyrites: it was in parts thickly coated with ferric hydrate. Weight of specimen, eight ounces. It contained:

Gold..... distinct trace.
Silver..... none.

Gold and Silver Assays, cont.

Province of British Columbia, cont.

91.—From Sugar Creek, branch half a mile south of junction.

A white sub-translucent quartz, carrying a little galena and iron-pyrites: it was for the most part stained with ferric hydrate. Weight of specimen, fourteen ounces. Assays gave:

Gold..... very distinct trace.
Silver..... 0·525 of an ounce to the ton of 2,000 lbs.

92.—From Mosquito Creek, Saunder's diggings, Cariboo District.

An association of a white sub-translucent quartz and felspar, with here and there, a few flakes of silvery-white mica: it was for the most part, stained and coated with ferric hydrate. Weight of specimen, fourteen ounces. It was found to contain:

Gold..... trace.
Silver..... none.

93.—From Mosquito Creek, Flynn's diggins.

An association of galena and iron-pyrites, in parts coated with ferric hydrate: it was apparently free from gangue. Weight of specimen, eight ounces. It contained:

Gold..... 0·182 of an ounce to the ton of 2,000 lbs.
Silver.....36·458 ounces " "

94.—From Mosquito Creek, also, from Flynn's diggins.

A white translucent quartz, with small quantities of siderite and chlorite. Weight of specimen, two pounds one ounce. Assays showed it to contain:

Gold..... trace.
Silver..... none.

95.—From "Lady of the Lake," Jack of Clubs Lake.

A white translucent quartz, in association with a small quantity of carbonaceous matter, carrying iron-pyrites: it was in parts stained with ferric hydrate. Weight of specimen, one pound ten ounces. It contained:

Gold..... very distinct trace
Silver..... none.

96.—From Grouse Creek, "Fountain Head" claim.

A white sub-translucent quartz, in association with a little chlorite: it was in parts much honeycombed, the cavities holding ferric hydrate. Weight of specimen, twelve and a-half ounces. It was found to contain:

Gold..... distinct trace.
Silver..... none.

97.—From Grouse Creek, "Dufferin" ledge.

It consisted of iron-pyrites in a gangue of white sub-translucent quartz, with which was associated a small quantity of carbonaceous matter. Weight of specimen, two and a-half pounds. Assays showed it to contain:

Gold ..... 2·042 ounces to the ton of 2,000 lbs.
Silver ..... 0·292 of an ounce " "

98.—From Barkerville, "Proserpine" ledge at Wilkinson House.

A white sub-translucent quartz, with which was associated a small quantity of carbonaceous matter and a little siderite, carrying a small amount of iron-pyrites: it was for the most part stained with ferric hydrate. Weight of specimen, two pounds one ounce. Assays gave:

Gold ..... trace.
Silver ..... none.

99.—From Barkerville, "Proserpine" ledge at "Proserpine" shaft.

An association of iron-pyrites and galena in a gangue, consisting of quartz and chlorite. Weight of specimen, two pounds thirteen ounces. It was found to contain:

Gold ..... 0·787 of an ounce to the ton of 2,000 lbs.
Silver ..... 20·738 ounces " "

100.—From Barkerville, "Home Rule" ledge.

An association of galena, iron-pyrites and limonite. Weight of of specimen, one pound. Assays showed it to contain:

Gold ..... 0·029 of an ounce to the ton of 2,000 lbs.
Silver ..... 6·562 ounces " "

101.—From Barkerville, also, from the "Home Rule" ledge.

A coarse crystalline galena, with here and there a small quantity of white translucent quartz: it was, in parts, coated with ferric hydrate. Weight of specimen, one pound fourteen ounces. It contained:

Gold ..... distinct trace.
Silver ..... 25·521 ounces to the ton of 2,000 lbs.

102.—From Barkerville, "Sergeant Lindsay" ledge.

A white sub-translucent quartz, for the most part stained and coated with ferric hydrate. Weight of specimen, two pounds eleven ounces. Assays gave:

Gold ..... trace.
Silver ..... 1·808 ounce to the ton of 2,000 lbs.

Gold and Silver Assays, cont.

Province of British Columbia, cont.

103.—From Barkerville, "Stanley" ledge, opposite "Van Winkle" dump.

A white sub-translucent quartz, in association with a small quantity of a dark bluish-grey chloritic mineral: it contained in parts a little ferric hydrate. Weight of specimen, two pounds fifteen ounces. It was found to contain:

Gold	distinct trace.
Silver	none.

104.—From Barkerville, "Stanley" ledge, opposite "Van Winkle" Company's house.

This material was very similar in character to that of last mentioned specimen. Weight of sample, nine ounces. It contained:

Gold	trace.
Silver	none.

105.—From Burns Mountain, "Jacques" ledge.

A white translucent quartz, carrying small quantities of galena and iron-pyrites. Weight of specimen, one and a-quarter pound. Assays gave:

Gold	very distinct trace.
Silver	3·442 ounces to the ton of 2,000 lbs.

106.—From Burns Mountain, "Perkins" ledge.

A white translucent quartz, much honeycombed, carrying a little galena: it was for the most part stained with ferric hydrate. Weight of specimen, one pound. Assays showed it to contain:

Gold	2·625 ounces to the ton of 2,000 lbs.
Silver	3·033 " " "

107.—From Burns Mountain, also from "Perkins" ledge.

A coarse crystalline galena, with here and there a few specks of pyrite, in association with a small quantity of white translucent to transparent quartz: it was in parts coated with ferric hydrate. Weight of specimen, two pounds ten ounces. It was found to contain:

Gold	0·365 of an ounce to the ton of 2,000 lbs.
Silver	29·896 ounces " "

108.—From Chisholm Creek, near Stanley; lowest stringers.

A white, sub-translucent quartz with a little chlorite: it was

for the most part stained with ferric hydrate. Weight of specimen, eleven ounces. It contained:

Gold	distinct trace.
Silver	none.

109.—From Lightning Creek, "Sam Montgomery's" ledge.

A white, sub-translucent quartz with which was associated a little chlorite: it was more or less stained with ferric hydrate. Weight of specimen, one pound fifteen ounces. Assays gave:

Gold	distinct trace.
Silver	none.

110.—From the "Hixon Creek" Mine, Hixon Creek, Upper Fraser River. Taken from a depth of about 200 feet.

It consisted of an association of chlorite and iron-pyrites, with a little calcite. Weight of specimen, three and three-quarter ounces.

It contained neither gold nor silver.

111.—Another specimen from this mine was found to contain:

Gold	0·408 of an ounce to the ton of 2,000 lbs.
Silver	1·225 ounce " "

112.—From the "Dunlevy" ledge, Island Mountain.

It consisted of iron-pyrites in a gangue of quartz. Weight of specimen, two pounds. It was found to contain:

Gold	0·233 of an ounce to the ton of 2,000 lbs.
Silver	0·350 " " "

113.—From near Granite Creek, Similkameen River.

It consisted of an impure rudely banded limestone stained with ferric hydrate. Weight of specimen, thirteen and a-half ounces. Assays gave:

Gold	trace.
Silver	0·029 of an ounce to the ton of 2,000 lbs.

114.—From Otter-Tail, seven miles south-east of Otter-Tail Station, Canadian Pacific Railway, Rocky Mountains. This, and the following five specimens were examined for Mr. G. Pollock.

It consisted of galena, through which was disseminated a very large amount of ferric hydrate. Weight of specimen, two and a-half ounces.

It contained neither gold nor silver.

115.—From the vicinity of Otter-Tail Station, Canadian Pacific Railway, Rocky Mountains.

Gold and Silver Assays, cont.

Province of British Columbia, cont.

The specimen, which consisted of purple copper ore, weighed two and three-quarter ounces. Assays showed it to contain:

Gold..... none.
Silver..... 19·687 ounces to the ton of 2,000 lbs.

116.—From the same locality as the last mentioned.

It consisted of a fine crystalline galena in association with small quantities of iron-pyrites and dolomite. Weight of specimen, one ounce. It was found to contain:

Gold..... none.
Silver..... 4·739 ounces to the ton of 2,000 lbs.

117.—This, and the two following specimens are from within two miles west of Field Station, on the line of the Canadian Pacific Railway, Kicking Horse (Hector) Pass, Rocky Mountains.

A white sub-translucent quartz, more or less coated with ferric hydrate. Weight of specimen, nine ounces.

It contained neither gold nor silver.

118.—A white translucent quartz thickly coated with ferric hydrate. Weight of specimen, eight ounces.

It contained neither gold nor silver.

119.—A white sub-translucent quartz, carrying copper-pyrites: it was for the most part coated with ferric hydrate, and here and there with a little green carbonate of copper. Weight of specimen, five ounces.

It contained neither gold nor silver.

120.—From mountain near Hope, Fraser River.

It consisted of magnetic-pyrites and a little iron-pyrites, together with a small quantity of a dark siliceous rock. Weight of specimen, twelve ounces. Assays showed it to contain:

Gold..... distinct trace.
Silver..... 0·263 of an ounce to the ton of 2,000 lbs.

121.—Described as casing rock of preceding specimen.

A rather fine-grained, greyish, banded silicious rock, containing a good deal of calcite, and here and there a few small grains of iron-pyrites. Weight of specimen, five and a-half ounces. Assays gave:

Gold..... trace.
Silver..... 0·116 of an ounce to the ton of 2,000 lbs.

122.—From Kamloops Lake, near Cherry Creek.

An association of quartz, calcite, and serpentine, with a little specular iron and a few specks of copper-pyrites. Weight of specimen, fourteen ounces. It was found to contain:

Gold	trace.
Silver	0·350 of an ounce to the ton of 2,000 lbs.

123.—From the North Thompson, above Clearwater River.

A white opaque quartz carrying small quantities of a dark leaden colored mineral (which was not identified as the abstraction of a sufficient amount of material to enable this to be done, would have injured the specimen for assay), and a little limonite. Weight of specimen, four and three-quarter ounces. It contained:

Gold	4·375 ounces to the ton of 2,000 lbs.
Silver	21·350 " "

124.—From the head of Waterton River, Rocky Mountains. Examined for Mr. G. Cusick.

An association of a white sub-translucent quartz, chloritic schist, and a little dolomite, carrying galena, magnetic-pyrites and a small amount of copper-pyrites: it was, in parts, coated with ferric hydrate, and here and there, stained with green carbonate of copper. Weight of specimen, eight ounces. Assays gave:

Gold	trace.
Silver	1·575 ounce to the ton of 2,000 lbs.

125—From a vein on the west side of the Upper Kootenay River, between the mouth of Finlay Creek and the upper crossing. This, and the five following specimens were examined for Mr. A. B. Grohman.

A milky white quartz in association with a little dolomite and greenish-grey chloritic schist: the whole was more or less coated with ferric hydrate. Weight of specimen, eleven ounces. It was found to contain:

Gold	trace.
Silver	none.

126.—From a lead on the south bank of Elk River, between the bridge and lower ford.

A white opaque quartz in association with small quantities of a bright green chloritic mineral: it contained, in parts, a little hematite and ferric hydrate. Weight of specimen, fifteen ounces.

It contained neither gold nor silver.

Gold and Silver Assays, cont.

Province of British Columbia, cont.

127.—From a lead on the south slopes of Cinnabar Mountain, Upper Kootenay River, above Canal flat.

An association of dolomite, red and white calcite, and crystalline quartz: it was, in parts, stained with ferric hydrate. Weight of specimen, six and a-half ounces.

It contained neither gold nor silver.

128.—From a lead on the south bank of the Kootenay River, about two miles above the upper crossing.

A white opaque, and greyish-white translucent quartz: in parts stained with ferric hydrate. Weight of specimen, seven and a-half ounces,

It contained neither gold nor silver.

129.—From near the outlet of Kootenay Lake.

Consisted, apparently, exclusively of bornite, through whieh was disseminated a few grains of colorless, transparent quartz. Weight of specimen, three-quarters of an ounce. It was found, on assay, to contain:

Gold ..... none.
Silver..... 119·218 ounces to the ton of 2,000 lbs.

130.—From the south-east quarter of lot eleven, township fifteen, New Westminster district.

A white translucent quartz, in association with chloritic schist: it contained a trifling amount of copper-pyrites, was in parts coated with ferric hydrate, and here and there, stained with green carbonate of copper. Weight of specimen, one pound five ounces. Assays gave:

Gold..... trace.
Silver..... none.

131.—From the vicinity of Illecillewaet Station, on the line of the Canadian Pacific Railway.

A very fine-grained bluish-grey siliceous rock, through which was disseminated a small quantity of magnetic-pyrites in very minute grains. Weight of specimen, one ounce.

It contained neither gold nor silver.

132—This, and the three following specimens are from the Illecillewaet district. They were examined for Mr. W. McGirr.

A coarsely crystalline galena. Weight of specimen, two ounces. On assay was found to contain :

Gold..... mere trace.
Silver..... 64·859 ounces to the ton of 2,000 lbs.

133.—A translucent quartz, carrying iron-pyrites : it was more or less stained with ferric hydrate. Weight of specimen, one and a-half ounces.

It contained neither gold nor silver.

134.—Consisted of zinc-blende, together with a few specks of copper-pyrites, in a gangue of greyish translucent quartz. Weight of specimen, ten and a-half ounces. Assays gave :

Gold..... distinct trace.
Silver..... 0·262 of an ounce to the ton of 2,000 lbs.

135.—A white translucent quartz, carrying a good deal of copper-pyrites. Weight of specimen, one pound five ounces. It was found to contain :

Gold..... trace.
Silver..... 2·946 ounces to the ton of 2,000 lbs.

136.—This, and the two following specimens are from within about a mile of the Illecillewaet Station, on the line of the Canadian Pacific Railway.

A moderately coarse crystalline galena, in a gangue of translucent quartz. Weight of specimen, one pound two ounces. It contained :

Gold..... none.
Silver..... 24·208 ounces to the ton of 2,000 lbs.

137.—An association of zinc-blende, galena, magnetic-pyrites and iron-pyrites, in a quartzose gangue. Weight of specimen, twelve and a-quarter ounces. Assays gave :

Gold..... trace.
Siiver..... 1·823 ounce to the ton of 2,000 lbs.

138.—Consisted of magnetic pyrites. Weight of specimen, one ounce. It was found to contain :

Gold..... trace.
Silver..... none.

139.—From the border of a lake in the vicinity of the Illecillewaet Station, on the line of the Canadian Pacific Railway. About two miles from the track, south side.

Gold and Silver Assays, cont.

Province of British Columbia, cont.

A magnetic sand. Weight of specimen, one pound five and a-half ounces. It was found, on assay, to contain:

Gold..... trace.
Silver..... none.

140.—From four miles east of the Illecillewaet Station, north side of the line of the Canadian Pacific Railway.

It consisted of magnetite, in a gangue of quartz and chlorite. Weight of specimen, six and a-quarter ounces.

It contained neither gold nor silver.

141.—This, and the following specimen are from about fifteen miles west of summit of the Selkirk Range, and three miles north of the line of the Canadian Pacific Railway.

It consisted of quartz, carrying a little galena. Weight of specimen, eleven ounces. It contained:

Gold..... trace.
Silver..... 6·475 ounces to the ton of 2,000 lbs.

142.—Consisted of galena, magnetic-pyrites, and iron-pyrites, with a little quartz. Weight of specimen, fourteen and a-quarter ounces. Assays gave:

Gold..... none.
Silver.....10·937 ounces to the ton of 2,000 lbs.

143.—From the Illecillewaet River.

An association of a coarsely crystalline galena, zinc-blende, and a little iron-pyrites, in a gangue consisting of translucent to transparent quartz, and chlorite. The metallic sulphides constituted, approximately, sixty-seven per cent., by weight, of the whole. Weight of specimen, six and a-quarter ounces. It was found to contain:

Gold..... trace.
Silver..... 45·208 ounces to the ton of 2,000 lbs.

144.—Same locality as the last.

A modeartely coarse, to coarse crystalline galena, with a little zinc-blende, and a small quantity of iron-pyrites, in a gangue composed of translucent quartz, together with a little chlorite and calcite: it was, in parts, stained and coated with ferric hydrate. The metallic sulphides constituted but a very small proportion of the whole. Weight of specimen, about thirteen pounds. Assays showed it to contain:

Gold..... trace.
Silver..... 9·683 ounces to the ton of 2,000 lbs.

145.—From the Illecillewaet River, Selkirk Range, north side of the valley. Received from Mr. G. R. Wright.

An association of iron-pyrites and galena, in a gangue of white, translucent quartz. Weight of specimen, three ounces. Assays gave:

Gold..... none.
Silver..... 247·917 ounces to the ten of 2,000 lbs.

146.—From the Illecillewaet River, Selkirk Range, south side of the valley. Received from Mr. G. R. Wright.

An association of galena, tetrahedrite and a little iron-pyrites, with some quartz. Weight of specimen, one and a-quarter ounce. It contained:

Gold..... none.
Silver..... 484·167 ounces to the ton of 2,000 lbs.

147.—A sample of material, from the same opening as the last, as dressed for shipment, and consisting, apart from a very small quantity of iron-pyrites, almost exclusively of tetrahedrite, was ound to contain:

Gold..... distinct trace.
Silver..... 816·667 ounces to the ton of 2,000 lbs.

148.—This, and the following eight specimens are from the Illecillewaet district.

A white opaque quartz, carrying a little tetrahedrite and a trifling amount of copper-pyrites: it was in parts coated with ferric hydrate; also with a little green and blue carbonate of copper. Weight of specimen, one ounce. Assays gave:

Gold..... trace.
Silver..... 248·646 ounces to the ten of 2,000 lbs.

149.—A moderately coarse crystalline galena, in association with quartz and a little hydrated peroxide of iron. Weight of specimen, two ounces. It contained:

Gold..... none.
Silver..... 47·396 ounces to the ton of 2,000 lbs.

150.—An opaque quartz, carrying small quantities of a moderately coarse crystalline galena and a trifling amount of iron-pyrites: it also contained, in parts, a little hydrated peroxide of iron. Weight of specimen, two ounces. It was found to contain:

Gold..... trace.
Silver..... 5·833 ounces to the ton of 2,000 lbs.

Gold and Silver Assays, cont.

Province of British Columbia, cont.

151.—A white opaque quartz, carrying galena, tetrahedrite, zinc-blende and a little iron-pyrites. Weight of specimen, one and a-half ounces. Assays showed it to contain:

Gold..... trace.
Silver..... 127·604 ounces to the ton of 2,000 lbs.

152.—A moderately coarse crystalline galena. Weight of specimen, two ounces. It was found, on assay, to contain:

Gold..... trace.
Silver..... 57·604 ounces to the ton of 2,000 lbs.

153.—Quartz carrying small quantities of galena and tetrahedrite: it was, in parts, coated with a little ferric hydrate and green carbonate of copper. Weight of specimen, four ounces. It contained:

Gold..... none.
Silver..... 0·729 of an ounce to the ton of 2,000 lbs.

154.—An association of moderately coarse crystalline galena and translucent quartz. Weight of specimen, three and three-quarter ounces. Assays gave:

Gold..... distinct trace.
Silver..... 54·687 ounces to the ton of 2,000 lbs.

155.—A coarsely crystalline galena, in association with a small proportion of translucent quartz: it was in parts stained and coated with ferric hydrate. Weight of specimen, not quite four ounces. It was found to contain:

Gold..... trace.
Silver..... 67·813 ounces to the ton of 2,000 lbs.

156.—An association of moderately coarse crystalline galena and tetrahedrite, together with small quantities of white, opaque, quartz. Weight of specimen, one and a-half ounce. Assays gave:

Gold..... none.
Silver..... 180·104 ounces to the ton of 2,000 lbs.

157.—From the "Kitawat" ledge, Kitawat, Gardner Inlet. Received from Mr. W. Downie.

It consisted of a white translucent quartz: carrying small quantities of copper-pyrites, zinc-blende, and galena. Weight of specimen, four pounds seven ounces. Assays showed it to contain:

Gold..... distinct trace.
Silver..... 4·433 ounces to the ton of 2,000 lbs.

158.—From Discovery Passage, Vancouver Island. Collected by Dr. G. M. Dawson. Gold and Silver Assays, cont.

A white sub-translucent quartz, carrying a little copper-pyrites. Weight of specimen, one pound ten ounces. Assays gave : Province of British Columbia, cont.

Gold.....	very distinct trace.
Silver.....	0·175 of an ounce to the ton of 2,000 lbs.

159.—From the Malaspina copper-mine, north-east side of Texada Island. Collected by Dr. G. M. Dawson.

It consisted of an association of copper-pyrites and iron-pyrites, together with a little magnetite, in a gangue composed of calcite, small quantities of a dark green chlorite, and a little quartz. The metallic sulphides constituted, approximately, fifty-five per cent., by weight, of the whole. Weight of specimen, five pounds five and a-quarter ounces. It was found to contain :

Gold.....	trace.
Silver.....	10·209 ounces to the ton of 2,000 lbs.

160.—From Harriet Harbor, Skincuttle Inlet, Queen Charlotte Islands.

The material here in question is referred to in the Report of Progress for 1878-79, Part B, p. 52, where it is described by Dr. G. M. Dawson as "a material which appears to be a felspathic ash rock containing a large proportion of calcareous matter. It is grey in color, speckled by the mixture of light and dark fragments, and shot through with iron-pyrites in small concretions and veins." Weight of specimen, one pound six ounces.

It contained neither gold nor silver.

161.—From the vicinity of the iron mine, north of Gillies Bay, Texada Island. Collected by Dr. G. M. Dawson and referred to by him in the Annual Report, vol ii., part B, p. 35.

It consisted of a granitoid rock, through which was disseminated a little iron-pyrites. Weight of specimen, one pound six ounces.

It contained neither gold nor silver.

MISCELLANEOUS EXAMINATIONS.

1.—Iron-pyrites.—From lot five, range four of the township of Darling, Lanark county, Ontario. Examined for Mr. H. Torrance. Iron pyrites from Darling, Lanark county, Ont.

Mr. F. D. Adams has made an analysis of a sample of ore from this locality, and with the following results :—

Sulphur			49·228
Arsenic			0·174
Iron (calculated)			43·074
Insoluble matter	6·353	gangue	8·299
Carbonate of lime	1·946		
Water, hygroscopic			0·141
			100·916

Other samples from this deposit have recently been assayed by Mr. R. A. A. Johnston for gold and silver—the results were negative.

Chromic-iron-ore from Thetford, Megantic county, P.Q.

2.—Chrome-iron-ore.—From lot seventeen, range four of Thetford. Megantic county, Province of Quebec. Examined for Dr. James Reed.

The specimen consisted of chromite in intimate association with massive and fibrous serpentine. Mr. E. B. Kenrick found it to contain :—

Chromic oxide	35·46 per cent.

Limestone from Agassiz Station, B.C.

3.—Limestone.—From near Agassiz Station, on the line of the Canadian Pacific Railway, British Columbia.

Three specimens of material from this deposit have been examined by Mr. F. D. Adams. The first, when treated with dilute hydrochloric acid left a considerable amount of a gritty insoluble residue. When burnt, the resultant product slaked readily, affording a fairly white lime of good quality. The second, when treated with acid, left a good deal of insoluble residue. The burnt material slaked readily, yielding a lime of very pronounced color, due to the presence of small quantities of iron-pyrites in the original stone. The lime could be used for all purposes where color was no object. The third, contained a very large amount of insoluble matter amounting, approximately, to rather more than fifty per cent. of the rock. The burnt material slaked but imperfectly. This stone is unsuited for the preparation of a lime.

Tin ore, reported finding of.

4.—Tin ore, reported finding of.—The material here referred to was brought to the Survey by Dr. J. Latimer, who stated that it had been taken from an opening on the sixth lot of the eleventh range of Whitton, Compton county, Province of Quebec.

It weighed eight pounds fourteen and a-half ounces: the material composing it was for the most part in the form of fragments, the balance was in the form of coarse sand and dust, this constituted, however, but a comparatively small proportion, by weight, of the whole.

The "bulk of the material" consisted of a greyish-white to white sub-translucent quartz, and a dark grey rock, together with a little chlorite, and felspar, all of which were (with an occasional exception in favor of the two former—a few of the fragments consisting almost exclusively of the one or the other) in more or less intimate association. All the fragments here referred to contained more or less iron-pyrites, most frequently well crystallized in cubes, and were to a greater or less extent stained or coated with ferric hydrate. Intermixed with the foregoing were two fragments of arsenical pyrites (one consisting almost exclusively of arsenopyrite, the other of an association of arsenopyrite with white translucent quartz), a fragment of intermixed magnetite and specular iron, and numerous fragments of tin stone, one of which weighed not less than nine and a-half ounces. The tin stone, which was in parts well crystallized, was remarkably free from gangue, containing but a trifling amount of rock matter consisting, essentially, of white translucent to opaque quartz. On two of the fragments of tin stone were observed, what apparently consisted of, the remains of imperfectly removed labels. In no instance could, even so much as a speck of tin stone be detected in any one single fragment of some three hundred fragments which went to make up what has been above described as "the bulk of the material," and which it was left to be inferred constituted the original gangue of the tin stone. The locality whence the foregoing was stated to have been obtained, was subsequently visited by Dr. R. W. Ells, of this Survey, who collected and forwarded me a sample of material, weighing some forty pounds, from the same opening. This was examined by Mr. F. D. Adams, who found the rock matter composing it to be very similar in character to that of the sample received from Dr. Latimer, it contained, however, much less iron-pyrites, no arsenical-pyrites, nor so much as a speck of tin stone.

The material of the first mentioned sample was, after separation of the cassiterite, submitted to assay, and found to contain a trace of gold but no silver.

Terra cotta, clay suitable for manufacture of. From Nassagaweya Halton county, Ont.

5.—Terra cotta.—A clay well suited for the manufacture of this ware, occurs on the east-half of lot two, range seven, of the township of Nassagaweya, Halton county, Ontario. When burnt, it assumes a very pleasing color, one that would more especially recommend it for works of an architectural character, such as bas-reliefs, friezes, and the like.

Zinc-blende.

6.—Zinc-blende.—What may prove to be an important deposit, the

extent of which has not, however, as yet been ascertained, of this ore occurs on the tenth lot of the fourth range of Calumet, Pontiac county, Province of Quebec. It consists of a more or less intimate association of zinc-blende and galena, together with small quantities of iron-pyrites. The proportion of the two latter, more especially the galena, to the former, varied greatly in different specimens. A fair average of numerous samples of this material was submitted to assay, and found to contain 11·666 ounces of silver to the ton of 2,000 lbs., together with traces of gold.

Magnetite pseudomorph after pyrite.

7.—Magnetite crystals pseudomorph after pyrite. When examining the sample of iron ore from the vicinity of Kinnear's Mills, referred to on a preceding page under Iron Ores—No. 2, Mr. E. B. Kenrick observed, imbedded in the same, some small crystals which were in the form of cubes with faces striated parallel to the edges of the pyritohedron. They were black in color and showed a high metallic lustre and brilliant faces. The best crystals had cubic edges, measuring one millimetre or less in length. The crystals were very magnetic, being easily picked up with a magnet. Streak brown. Soluble in aqua regia with very slight residue. Gave off water in closed tube. A crystal weighing ·0083 gram lost on ignition ·0008 gram, or 8·6 per cent. of water. This crystal was magnetic after ignition, and remained unchanged in appearance. It would appear that the crystals are pseudomorphs after iron-pyrites in an intermediate stage between limonite and magnetite.

Stibnite from Foster's Bar, Fraser River, B.C.

8.—Stibnite. This mineral has been found near Foster's Bar, about twenty-three miles from Lytton, Fraser River, British Columbia. The sample received, and which weighed rather less than four pounds, was remarkably pure, being almost entirely free from gangue. Assays showed it to contain a trace of gold, and 2·187 ounces of silver to the ton of 2,000 lbs.

Rose-colored muscovite from Villeneuve, Ottawa county, P.Q.

9.—Rose-colored muscovite.—Amongst some of the interesting specimens recently collected by Mr. C. W. Willimott was one—found by him on lot thirty-one of the first range of Villeneuve, Ottawa county, P. Que.—consisting of a rose-red colored mica and pale-green muscovite, in a matrix composed of albite with a little white translucent quartz. The first mentioned, when heated before the blowpipe, was found to be difficulty fusible and to give a slight yet distinct lithia re-action. It apparently, closely resembles, if indeed it is not identical with, the rose-red colored muscovite of Goshen, Mass., examined by Prof. J. W. Mallet.

P.S./2682

6